

TEMPORAL AND SPATIAL VARIATION OF PACIFIC-ORIGIN SUMMER WATER IN THE CHUKCHI BORDERLAND, ARCTIC OCEAN

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ABSTRACTS

The Arctic Ocean may be a sensitive indicator of global climate changes. During 2012 summer, the extent of Arctic sea ice has reduced dramatically. These changes affect both the Arctic and global climate system by altering the heat exchanges between the ocean and atmosphere. The warm water inflow from the Bering Sea is recognized as an important driving force for rapid reduction of sea ice associated with an increase in the horizontal and vertical flux of heat, salt and momentum (Shimada et al., 2006; Carmack and Melling, 2011). The Pacific-origin Summer Water (PSW) reaches the mouth of the Barrow Canyon along the Alaskan Coast in the Chukchi Sea. After that PSW changes its advective direction toward northwest along the northern slope of the Chukchi Sea and is delivered in the Chukchi Borderland (CBL) region consisting of the Northwind Ridge and Chukchi Plateau. In 2012, the major pathway of PSW located on the Northwind Ridge. And, the PSW has been gradually extended toward the west direction as compared with previous investigations. This suggests that some changes in ice and ocean circulation regime occurred in 2011/2012 winter. The salinity of PWW at minimum potential temperature layer has decreased slightly in 2012. Also, the potential temperature of PWW on the Northwind Ridge was relatively colder than that on Chukchi Plateau. The water mass stratification is classified into two categories according to the bottom depths in the East Siberian Sea and Makarov Basin. In the region shallower than 1000m, volumetric cold water with its minimum temperature around $S=32.3-32.5$ spread from shelf region to the shelf slope about 1000m iso-bathymetry. In the deep Makarov Basin deeper than 1000m, oxygen rich lower halocline water dominated.